A CONCEPTUAL FRAMEWORK

*Here we offer a conceptual framework for describing the semantic content of **social attributions: identifications and characterizations viewers make about ACTORS involved in the production and dissemination of visualization artifacts**. Social attributions are a form of inference. The structure of this framework can be used to: (1) generate questions for semi-structured interviews, engagement tasks and surveys, and (2) applied as a coding scheme to describe the semantic content of (written or spoken) statements about visualizations.*

	SUBJECT *the subject, or topic of the statement* *(who/what is being referenced)*	PROPERTIES *aspects of the SUBJECT described in the* *statement (what about the SUBJECT is referenced)*	ATTRIBUTIONS *expressions (statements, comments, utterances)* *that identify or characterize some PROPERTY of an ACTOR*
ACTORS	**MAKER (ambiguous)** entity responsible for artifact (role in making not specified)		"It kind of has the vibe of like **young career professional** advice by someone who's not qualified, but wants to sell their advice anyway."
	MAKER — Principal entity responsible for *having* *the artifact made*	identification (i.e. what specific maker), age, gender, trustworthiness, political affiliation, occupation, interests, communicative intent, ... etc.	"I'd say this is more of a **news agency, or like NGO**, but not super large or super old."
	MAKER — Author entity responsible for *creating* the artifact		"Feels like it was **made by like an intern in a DC office**. It's made by someone who is savvy enough to understand how these things work, but isn't like a graphic designer. And that kind of gives it a hint of sincerity."
	MAKER — Animator entity responsible for *distributing* and/or *sharing* the artifact		"**A Tumblr user posted** this to dunk on it."
	MODE venues, sources, channels etc. through which an artifact is published or distributed	identification (i.e. which distribution channel), medium (e.g. online, print), ... etc.	"I wouldn't be shocked to see this in some sketchy **Youtube videos**."
	TOOL instrument(s) used in the artifact's production	identification (i.e. which specific tool), purpose (e.g. design, visualization, programming), complexity (e.g. basic, advanced), ... etc.	"Because if it's so pretty that it's clearly been made by a graphic designer and approved by a marketing team, it's trying to sell you something. Whereas this? **Microsoft Office** vibes are very neutral and a little bit more objective"
	DATA entities explicitly encoded in the artifact	identification (i.e. which specific dataset), topic, source, structure (e.g. timeseries, geospatial), ...etc.	**These numbers** were guestimated or pulled from questionable internet [sources] [...] I don't know that I would believe that any data in here has any kind of actual backup in reality.
	ARTIFACT the material substance of the artifact itself	identification (i.e. the specific artifact), chart type (e.g. bar chart, area chart), mark, spatial dimension, typography (e.g. text and labels), background color, communicative intent, ...etc.	"**This pie chart** isn't the typical meme setup."

B RELATIONSHIP TO OTHER FRAMEWORKS

Through analysis of comments on the subreddit r/dataisbeautiful, Kauer & colleagues defined (4) "Scopes" (describing the **subject** of a statement), and (10) "Types" (describing the **form** of a statement). By asking questions about first impressions and social provenance, we are able to elicit 3 additional scopes (that we refer to as **ACTORS**) and an additional form we call **SOCIAL ATTRIBUTIONS**.

Comment SCOPE
(Kauer et. al, 2021)

Characterizes the **SUBJECT** of a statement made in reaction to a visualization.

Our interview and survey elicited statements about TOOLS, MODES AND MAKERS, as well as comments about DATA* and VISUALIZATIONS. We refer to the entities involved in the social provenance of the artifacts as **ACTORS** and use the term **SUBJECT** to refer to the subject of the comment, equivalent to Kauer et. al's use of the term SCOPE.

Comment CONTENT (v) CONTEXT

Hullman & colleagues (2015)differentiate between comments about **content** (the visualization, data, or article presented) and **context** (how the issue is located within a broader set of conditions). In our view, this distinction might serve as a way grouping mechanism, in which DATA and VISUALIZATION are considered content, and the rest of the categories as context.

TOPIC
INSIGHT
DATA
VISUALIZATION
+ TOOL
+ CHANNEL
+ MAKER

Comment TYPE
(Kauer et. al, 2021)

Characterizes the **FORM** of a statement made in reaction to a visualization.

Our interview and survey elicited statements in the form of SOCIAL ATTRIBUTIONS. Note that in Kauer et. al may have collected comments of the type social attribution, but perhaps classified these as CRITIQUES or OPINIONS.

Comment CRITICAL (v) not CRITICAL

Hullman & colleagues (2015) also differentiate between comments that are offered critique of some aspect of the presentation. We view this as a likely third dimension, on which any of these reaction types might be classified. In our own data, it was not readily apparent in written form when attributions were being made in critique, but was often present in interviews by judging the prosody and other extra-linguistic features of the participant's speech.

OBSERVATION
CONCLUSION
HYPOTHESIS
CLARIFICATION
PROPOSAL
CRITIQUE
ADDITIONAL INFORMATION
TESTIMONY
OPINION
OTHER
+ SOCIAL ATTRIBUTION